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10/594,864	11/30/2006	Takashi Shinohara	701067	1275

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EXAMINER	
SGAGIAS, MAGDALENE K	

ART UNIT	PAPER NUMBER
1632	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/594,864	SHINOHARA ET AL.	
	Examiner	Art Unit	
	MAGDALENE K. SGAGIAS	1632	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *31 July 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *29 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/2/07; 7/11/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Applicant's arguments with respect to claims 1-16 have been considered but are moot in view of the new ground(s) of rejection.

Claims 1-16 are pending and under consideration. The amendment has been entered.

Claims 17-34 have been canceled.

Specification

The amendment to the specification filed 7/31/08 has been entered.

Applicant's English translation of the foreign application JAPAN P. 2004-101320 03/30/2004 has been acknowledged.

Applicants IDS filed on 1/2/07 and 7/11/07 has been acknowledged.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-6 rejection under 35 U.S.C. 102(b) as being anticipated by **Nagano et al,** [Biology of Reproduction, 68: 2207-2214, 2003 (IDS)] is withdrawn in view of the amendment.

Claims 8-11 rejection under 35 U.S.C. 102(a) as being anticipated by **Kubota et al,** (PNSA, 101(47): 16489-16494, 2004) is withdrawn.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagano et al,** [Biology of Reproduction, 68: 2207-2214, 2003, (IDS)] in view of **Matsui et al.** [Cell, 70(5): 841-847, 1992, (IDS)].

Nagano et al, teach culturing testis cells from transgenic mice which express lacZ in all cell types including all types of postnatal male germ cells using a medium containing glial derived neurotrophic factor (GDNF), leukemia inhibitory factor (LIF), basic fibroblast growth factor (bFGF) and feeder cells (p 2208, 1st column under Materials and Methods) (claims 1-4). Nagano teaches the testis cells are spermatogonial stem cells (SSC), wherein the spermatogonial stem cells are germ cells (whole document) (claims 5-6). Nagano et al. teach although the increase in the efficiency of in vitro SSC maintenance, was no more than 2.2-fold compared with the control culture, perhaps because donor cells placed in culture were heterogeneous and included testicular somatic cells (p 2213, 1st column, last paragraph). Therefore, elimination of testicular somatic cells may be critical for more intensive investigations into the in vitro behavior of SSCs and their proliferation/differentiation mechanisms. Strategies developed recently to enrich SSCs by multiparameter selection will facilitate such investigations

(p 2213, 1st column, last paragraph). Nagano suggests the need for establishment of an efficient SSC culture system will greatly contribute to our ability to explore the factors involved in the SSC fate decision (p 2213, 1st column, last paragraph). Nagano also suggests the development of the spermatogonial transplantation technique has now provided the opportunity to evaluate in vitro requirements for SSC maintenance, and this technique together with stem cell enrichment strategies will be important for future investigations (p 2213, 1st column, last paragraph). These investigations will allow a better understand the biology of the stem cell and the stem cell niche, and successful long-term culture will enable efficient expansion, alteration, and selection of SSCs for male fertility restoration and germ line gene modification (p 2213, 1st column, last paragraph). Nagano et al differs from the present invention by not teaching isolating pluripotent stem cells from the SSCs.

However, at the time of the instant invention Matsui et al teaches derivation of pluripotent embryonic stem cells from murine primordial germ cells in culture (title). Steel factor (SF) and LIF (leukemia inhibitory factor) synergistically promote the proliferation and survival of mouse primordial germ cells (PGCs), but only for a limited time period in culture. Matsui teaches the addition of bFGF to cultures in the presence of membrane-associated SF and LIF enhances the growth of PGCs and allows their continued proliferation beyond the time when they normally stop dividing in vivo. They form colonies of densely packed, alkaline phosphatase-positive, SSEA-1-positive cells resembling undifferentiated embryonic stem (ES) cells in morphology. These cultures can be maintained on feeder layers for at least 20 passages, and under appropriate conditions give rise to embryoid bodies and to multiple differentiated cell phenotypes in monolayer culture and in tumors in nude mice. PGC-derived ES cells can also contribute to chimeras when injected into host blastocysts. The long-term culture of PGCs and their reprogramming to pluripotential ES cells has important implications for germ cell biology

and the induction of teratocarcinomas. As such the isolation of pluripotent stem cells from mouse SSCs was well known in the art at the time of the instant application was filed. As such Matsui et al provide sufficient motivation to one of ordinary of skill in the art to use the methodology of Matsui to isolate pluripotent stem cells from the cultured testis system of Nagano.

Accordingly, in view of the teachings of Matsui it would have been obvious for one of ordinary of skill in the art, at the time of the instant invention was made, to isolate pluripotent stem cells from the SSCs of Nagano et al in mouse testis with a reasonable expectation of success. One of ordinary of skill in thee art would have been sufficiently motivated to isolate pluripotent stem cells from mouse SSCs as Matsui have suggested isolated pluripotent embryonic stem cells from murine primordial germ cells in culture can be maintained on feeder layers for at least 20 passages. One of ordinary of skill in the art would have been particularly motivated since Nagano have suggested the need for establishment of an efficient SSC culture system in order to contribute to our ability to explore the factors involved in the SSC fate decision. Therefore, in view of the teachings of Nagano/Matsui one of ordinary of skill in the art would be motivated and expect success in isolating and expanding for long term cultures of pluripotent stem cells from mouse testis. Nagano and Matsui taken together, provide teaching, suggestion and motivation to perform the instantly claimed methods.

The instant claims combine the elements of isolating pluripotent stem cells from mouse SSCs from mouse testis, which taught by Nagano and Matsui. This general method of using GDNF to produce SSCs from mouse testis has been shown to be used successfully with mouse testis, as expected and predictable isolation of pluripotent stem cells from cultured mouse testis in the instantly claimed methods. Supreme Court reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious

when it does no more than yield predictable results." KSR International Co. v. Teleflex Inc. (KSR), 550 U.S. at, 82 USPQ2d at 1395. Therefore, in view of Nagano and Matsui it would be prima facie obvious for one of skill in the art to use GDNF to isolate SSCs from mouse testis and isolate pluripotent stem cells with the expected result of producing pluripotent stem cells.

Thus, the claimed invention as a whole, is clearly prima facie obvious in the absence of evidence to the contrary.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagano et al,** (Biology of Reproduction, 68: 2207-2214, 2003(IDS)) in view of **Matsui et al.** (Cell, 70(5): 841-847, 1992, (IDS)); **Beumer et al** (Cell Death and Differentiation , 5: 669-677, 1998).

The 103 rejection of claim 7 as being unpatentable over Nagano taken with Matsui is applied here as indicated above.

Nagano taken with Matsui, do not teach the testis cells are p53-deficient. However, at the time the invention was made, Beumer et al teach spermatogonia cell production by the undifferentiated spermatogonia is much more efficient in p53 knock out mice than in wild-type mice, indicating enhanced proliferative activity or less apoptosis of these cells (p 675, 1st column, 1st paragraph). Beumner is an exemplified prior art that teaches that it is routine or well-established in the art to employ p53-deficient testis cells as a source of obtaining SSCs since p53 knock out mice, constitute an increased numbers of spermatogonia (p 670, 1stcolumn, 1st paragraph).

Thus, it would also have been obvious for one of ordinary skill in the art of isolating pluripotent stem cells from mouse testis to further employ p53 knock testis from p53 knock out mice of choice available in the art in order to obtain SSCs from undifferentiated spermatogonia and isolating pluripotent stem cells from cultured testis cells of the combined cited reference. One of ordinary skill in the art would have been motivated to employ p53 deficient testis cells in

the system of Nagano/Matsui in order to increase the number of undifferentiated SSCs as taught by Beumer. One of ordinary skill in the art would have reasonably expected that inclusion of p53 deficient testis cells are routinely employed in the art and can help to further isolate pluripotent stem cells from mouse testis particularly in view of the totality of the prior art at the time the invention was made.

Thus, the claimed invention was prima facie obvious.

Claims 8-11 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagano et al,** (Biology of Reproduction, 68: 2207-2214, 2003, (IDS)) in view of **Matsui et al.** (Cell, 70(5): 841-847, 1992, (IDS)); **Meng et al,** [Science, 287: 1489-1493, (IDS)]; **Donovan et al,** (Current Opinion in Genetics & Development, 13: 469-471, 2003, (IDS)).

The 103 rejection of claims 8-11 as being unpatentable over Nagano taken with Matsui is applied here as indicated above.

Nagano taken with Matsui do not teach the production of pluripotent stem cells comprising the steps: (step 1) culturing testis cells in GDNF medium or an equivalent thereto obtain cultured cells; (step 2) culturing the cultured cells obtained in step 1, using medium containing LIF to obtain pluripotent stem cells.

However, at the time of instant invention was made, Meng et al teach GDNF dosage regulates the differentiation of undifferentiated spermatogonia (p 1492, 1st column bridge to 2nd column). At a low GDNF level, spermatogonia favor differentiation, and at a high level, they favor self-renewal (p 1492, 1st column bridge to 2nd column). The disturbed spermatogenesis in the GDNF+/- mice closely mimics the morphology of many human cases of impaired spermatogenesis and can be used as a new model for male infertility (p 1492, 1st column bridge to 2nd column). Molecules activating the Ret signaling cascade may provide means to restore

reduced spermatogonia pools in infertile men (p 1492, 1st column bridge to 2nd column). Meng suggests the effects on spermatogenesis should be taken into consideration when lead molecules activating the GDNF signaling cascade are designed for use in therapy for neurodegenerative disorders (p 1492, 1st column bridge to 2nd column). As such the use of high levels of GDNF as a first step to favor self renewal of undifferentiated SSCs is taught by Meng was well known in the art at the time of instant application was filed. Donovan et al supplements the teachings of Meng by teaching turning germ cells into stem cells (title). Donovan teaches derivation of embryonic germ (EG) cells provides a unique insight into the formation of pluripotent stem cells (p 465, 2nd column). Primordial germ cells (PGCs) are cultured on feeder cells (p 1492, 1st column bridge to 2nd column). Feeder layers produce factors such as kit ligand (KL) that are required for PGC survival and also factors that stimulate PGC proliferation (p 1492, 1st column bridge to 2nd column). In culture, PGCs are mortal, proliferate for 7–10 days, and then disappear either because they differentiate or die. They may differentiate in vitro over the same time period as they would in vivo (p 1492, 1st column bridge to 2nd column). But when PGCs are exposed to three polypeptide growth factors KL, leukemia inhibitory factor (LIF) and basic fibroblast growth factor (bFGF), they continue to proliferate and form large colonies of cells that can be expanded indefinitely (emphasis added) (p 1492, 1st column bridge to 2nd column). Those cells, which are termed EG cells, continue to express the PGC markers TNAP and Oct4, which are also ES and EC cell markers. Assays of developmental potential show EG cells to be pluripotent. Human PGCs exposed to the same growth factors also form EG cells that are pluripotent, suggesting that several of the pathways regulating germline development have been conserved throughout mammalian evolution. Like human ES cells, human EG cells are thought to have tremendous potential for treatment of human disease and for analysis of human development (reviewed in (p 1492, 1st column bridge

to 2nd column). Donovan suggests most likely KL and LIF act as survival factors and co-mitogens to control PGC survival and proliferation. Therefore, gp130-mediated signaling is required for PGC survival and together with c-Kit signaling promotes PGC proliferation. As such Meng provides sufficient motivation to the use of high levels of GDNF as a first step to favor self renewal of undifferentiated SSCs and Donovan to use medium containing the three polypeptides KL, LIF and bFGF in order for the PGCs to continue to proliferate and form large colonies of cells that can be expanded indefinitely as a second step as taught by Donovan.

Accordingly, in view of the teachings of Meng and Donovan, it would have been obvious for one of ordinary of skill in the art to use GDNF as a first step and LiF as a second step for the production of pluripotent stem cells from testis cells by modifying the system of Nagano/Matsui. One of ordinary of skill in the art would have been sufficiently motivated for such a modification since it was art goal to produce pluripotent stem cells from testicular SSCs from all different species particularly in view of the totality of the prior art at the time the invention was made. Nagano/Matsui/ Meng/Donovan provide teachings, suggestion, and motivation to perform the instantly claimed methods.

The instant claims combine the elements of isolating pluripotent stem cells from different species of SSCs including from mouse testis, which taught by Nagano and Matsui via step 1 and step 2 as taught by Meng.Donovan. This general method of using GDNF to produce SSCs from different species including mouse testis has been shown to be used successfully with mouse testis, as expected and predictable isolation of pluripotent stem cells from cultured mouse testis in the instantly claimed methods. Supreme Court reaffirmed principles based on its precedent that "[t]he combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." KSR International Co. v. Teleflex Inc. (KSR), 550 U.S. at, 82 USPQ2d at 1395. Therefore, in view of Nagano and Matsui

and Meng and Donovan it would be prima facie obvious for one of skill in the art to use GDNF to isolate SSCs from different species including mouse testis and isolate pluripotent stem cells with the expected result of producing pluripotent stem cells.

Thus, the claimed invention as a whole, is clearly prima facie obvious in the absence of evidence to the contrary.

Claims 11-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Nagano et al,** (Biology of Reproduction, 68: 2207-2214, 2003, (IDS)) in view of **Matsui et al.** (Cell, 70(5): 841-847, 1992, (IDS)); **Meng et al,** [Science, 287: 1489-1493, (IDS)]; **Donovan et al,** (Current Opinion in Genetics & Development, 13: 469-471, 2003 (IDS)); **Kanatsu-Shinohara et al, [**Biology of Reproduction 70, 70–75 ,2004, (IDS)]; **Shinohara et al,** [PNAS, 96: 5504-5509, 1999, (IDS)].

The teachings of Nagano et al/Matsui et al/Meng//Donovan is applied here as indicated above.

Nagano/Matsui/Meng//Donovan does not teach the pluripotent stem cells are positive for the claimed surface markers.

However, at the time of the instant invention Kanatsu-Shinohara et al, teach spermatogenesis is dependent on a small population of stem cells (abstract). Despite the biological significance of spermatogonial stem cells, their analysis has been hampered by their scarcity. However, spermatogonial stem cells can be enriched by selection with an antibody against cell-surface molecules. Kanatsu-Shinohara teaches spermatogonial stem cells express the surface CD9 molecule, which is commonly expressed on stem cells of other tissues (abstract). Selection of both mouse and rat testis cells with anti-CD9 antibody resulted in 5- to 7-fold enrichment of spermatogonial stem cells from intact testis cells, indicating that CD9 is

commonly expressed on spermatogonial stem cells of both species (abstract). Therefore, CD9 may be involved in the common machinery in stem cells of many self-renewing tissues, and the identification of a common surface antigen on spermatogonial stem cells of different species has important implications for the development of a technique to enrich stem cells from other mammalian species (abstract). As such Kanatsu-Shinohara et al, provide sufficient motivation to enrich pluripotent stem cells by the use of the CD9 marker as taught by Kanatsu-Shinohara et al. Shinohara et al, supplements the teachings of Kanatsu-Shinohara et al, by teaching SSCs also express the surface markers β1- and a6 integrin (title). Shinohara suggests the degree of enrichment of stem cells attainable by this method will allow further fractionation and analysis of the enriched cell population to identify a set of additional antigens characteristic of and unique for spermatogonial stem cells (p 5509, 1st column, 1st paragraph). A systematic evaluation of surface molecules on the stem cell will facilitate identification and purification of these cells and greatly contribute to our understanding of their biology and survival requirements. This approach mirrors developments made with hematopoietic stem cells during the last decade. As stem cell markers are identified, enrichment for stem cell populations can be increased, facilitating their eventual purification.

Accordingly, in view of the teachings of Kanatsu-Shinohara/Shinohara, it would have been obvious for one of ordinary of skill in the art to use the SSC surface markers of CD9, β1- and a6 integrin for the production of enriched pluripotent stem cells from testis cells by modifying the system of the combined references in the art. One of ordinary of skill in the art would have been sufficiently motivated for such a modification since it was art goal to produce enriched pluripotent stem cells from testicular SSCs from all different species particularly in view of the totality of the prior art at the time the invention was made. Nagano/Matsui/

Meng/Donovan/ Kanatsu-Shinohara/Shinohara provide teachings, suggestion, and motivation to perform the instantly claimed methods.

Thus, the claimed invention as a whole, is clearly prima facie obvious in the absence of evidence to the contrary.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1-16 rejection under 35 U.S.C. 112, first paragraph, is withdrawn.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 1-6 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-7, 12 of copending Application No.

10/553,118. Although the conflicting claims are not identical, they are not patentably distinct from each other because the methods in both claims overlap in scope of having culturing the cells under GDNF, LIF and feeder cells is maintained for the reasons of record.

Conclusion

No claim is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Magdalene K. Sgagias whose telephone number is (571) 272-3305. The examiner can normally be reached on Monday through Friday from 9:00 am to 5:00 pm. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Paras, Jr., can be reached on (571) 272-4517. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll free).

Magdalene K. Sgagias, Ph.D.
Art Unit 1632

/Anne-Marie Falk/
Anne-Marie Falk, Ph.D.
Primary Examiner, Art Unit 1632